Available online at www.sciencedirect.com

ScienceDirect

Procedia Technology 11 (2013) 840 – 845

Procedia Technology

The 4th International Conference on Electrical Engineering and Informatics (ICEEI 2013)

Development and Validation of Game Interface with Culture Questionnaire: Graphic and Animation

Ratna Zuarni Ramli[a,*], Noraidah Sahari[b], Nor Azan Mat Zin[b], Norlis Othman[a], Salyani Osman[c]

[a]*Universiti Teknologi MARA Kuala Pilah, Negeri Sembilan, Malaysia*
[b]*Universiti Kebangsaan Malaysia , Bangi, Selangor, Malaysia*
[c]*Bestari Jaya, Universiti Selangor , Bestari Jaya, Selangor, Malaysia*

Abstract

Cultural values that are held by individuals within a society control how they act and believe. People with different culture may have different perception on the same subject. Due to this reason, some people may find difficulties playing computer games since the design is not intuitive and natural enough for the player. Hence, a model of game interface with cultural values is designed based on literature. The model consists of graphic and animation and four cultural elements – PDI, MAS, HC and IDV. This paper presents the development and validation of questionnaire for use to verify the game interface model .The study employed a mixed method design which consists of qualitative and quantitative method. Four panel of experts in the area of culture and human computer interface (HCI) were selected to validate the questionnaire, through structured interview. The face validation process involved five game players. For quantitative method, purposive sampling of 52 respondents was carried out. After development and validation process completed, 30 questions of game interface with cultural values remain. Some changes have been made on questions based on experts' reviews. The reliability of the questionnaire, α = .955. The questionnaire is validated and reliable, thus it is good for use to verify the model.

Selection and peer-review under responsibility of the Faculty of Information Science & Technology, Universiti Kebangsaan Malaysia.

Keywords: Game Interface; Cultural element; Hofstede dimension; High context; Graphic; Animation.

* Corresponding author.
E-mail address: ratna@ns.uitm.edu.my

Selection and peer-review under responsibility of the Faculty of Information Science & Technology, Universiti Kebangsaan Malaysia.
doi:10.1016/j.protcy.2013.12.266

1. Introduction

Culture is defined as a mental model that influences the way people think, give reaction and respond to circumstances [1]. Culture also plays a significant role in communication. People with different culture may have different perception on the same element. In order to design an effective technology, designer needs to be sensitive to cultural differences [2]. The same principle is applicable to the design of computer game interface. Some players may have difficulties interpreting messages of the game interface. Since interface is the medium of communication between player and the game [3], and culture can influence the way people communicate [4], the design of game interface should integrate cultural values. Although gaming is becoming a common activity among youngster and adult all over the world, the effect of culture on the design of game interface is yet to be discovered.

Some elements of game interface are graphic, animation, color, menu button, text and layout [5]. All these elements should be designed intuitively so that it will be easy enough for players to understand. For the purpose of this study, graphic and animation are two elements selected as focal point. Graphic is a still image on game interface that carries messages [6]. It can be an object in the background, an image on menu button or a symbol. Animation is a moving image that also carries messages. It can be a character in the game, moving object in the background or animated menu button [3, 7].

Four elements of culture, power distance index (PDI), masculinity (MAS), individualistic (IDV) and high context (HC)[1] are used to discover cultural effects on graphic and animation on game interface. These elements have been used by researchers in various areas. A culture with a high PDI value indicates that the people in this culture expect and accept unequal power distribution among them. Average value of MAS indicates culture driven by competition achievement is well balanced with values of caring for others and concern for quality of life. Low value of IDV signifies that people that held this cultural value are not self centered and love to work in a team [1]. Hall [4] introduced HC cultural value which can be determined by differentiating some factors, for example the emotion of close relationship, indirectness of message, and nonverbal language.

Based on past researches [8, 9, 10, 11]; HC, PDI and MAS was found to influence the design of graphic while HC, MAS and IDV influenced the design of animation. Fig. 1 shows the relationship between cultural values and game interface. A set of questionnaire is developed based on the model in Fig 1. This questionnaire needs to be validated to make sure the quality of the questionnaire in getting reliable result. In this scenario, the validated questionnaire describe the relationship between culture and game interface design. Thus, the validated questionnaire may verify the designed model in Fig 1.

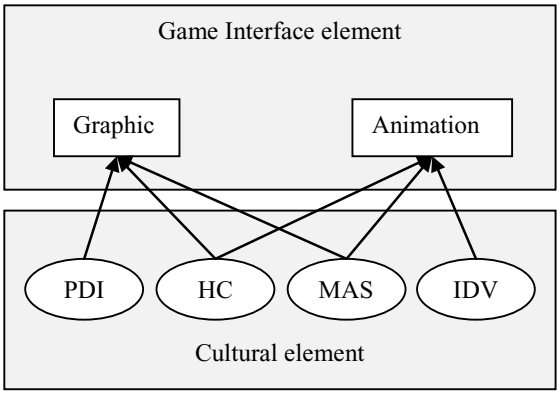

Fig . 1 Model of game interface with cultural values

2. Method

Questionnaire is considered as a cheap and easy way to collect data from a large number of respondents. A well-designed questionnaire can gather information about the overall performance of specific component. There are multiple ways to develop and validate questionnaire. In this research scenario, a model of game interface with cultural value is designed based on previous researches. A set of questionnaire is developed based on the model and validated using mixed methods research design. Mixed method is a qualitative and quantitative research used to obtain a more accurate result. The aim of qualitative approach is to develop and validate the contents of the survey instrument, while the quantitative approach is to validate and pilot test the survey instrument [12]. There are four phases involved in the process to develop and validate the questionnaire which are question formulation, expert panel review, game panel review and pilot test. The aim of first phase is to formulate the questionnaire by adapting existing questionnaire and input from previous researches. In the second and third phase, the selected experts and game player are needed to evaluate the developed questionnaire in terms of content and face validation. Finally in the last phase, a pilot test that consists of 30 questions is conducted. Fig 2 shows the process of development and validation of questionnaire.

2.1. Development of Questionnaire

Model Value Survey (VSM94) is a 26 items questionnaire that has been validated and designed by Hofstede to compare the value of a country's culture. It consists of five constructs; PDI, MAS, IDV, uncertainty avoidance index (UAI) and long term orientation (LTO). Since, only three of Hofstede culture elements - PDI, MAS and IDV are employed in this research, VSM94 is filtered for this purpose. Thus, from 26 items in the questionnaire, only nine were extracted. Four questions of MAS are repeated twice; once each for graphic and animation. As a result, 13 items are adapted from VSM94. Other than VSM94, there are researches that have been done to discover the influence of culture on the design of graphic and animation in different medium like electronic advertisement and website design. Based on these researches' outcomes, another three items are added to the questionnaire. These three items are repeated twice for graphic and animation. Therefore, in total of 19 closed ended questions are used in this set of questionnaire. The respondents need to give their answer based on a 10-point Likert scale ranging from 1- for strongly disagree to 10- for strongly agree. Basically for graphic there are ten closed ended questions while animation has nine closed ended questions.

2.1 Qualitative Method

The qualitative method selected is structured interview. This method is suitable for the research as it can maintain a focus and at the same provides detailed information on the given issue [12]. Four panel experts from multi disciplines are chosen based on their experience and knowledge background. They are two experts from human computer interface (HCI), one expert in cultural studies and one expert in both computer science and cultural studies. A set of questionnaire which consists of 19 closed ended questions with original items from VSM94 and other literature is given to the experts for content validation. The experts need to rate the suitability of the questions by using a 10-point Likert scale. They also need to give comment on each question, which were recorded by the researcher. The duration of the structured interview is from 30 minutes to 60 minutes. All four experts do content and face validation. Corrections were made based on the first round of the interview sessions, and then the same process is repeated for the second draft questionnaire. Result from the second session of the interview was regarded as the final one.

For the third round structured interview, five computer game players were selected to go through the questionnaire for validation process. This is an important step to make sure the actual respondents who are game players understand the questions clearly and easily. In addition, eleven demographic questions have been added to the questionnaire.

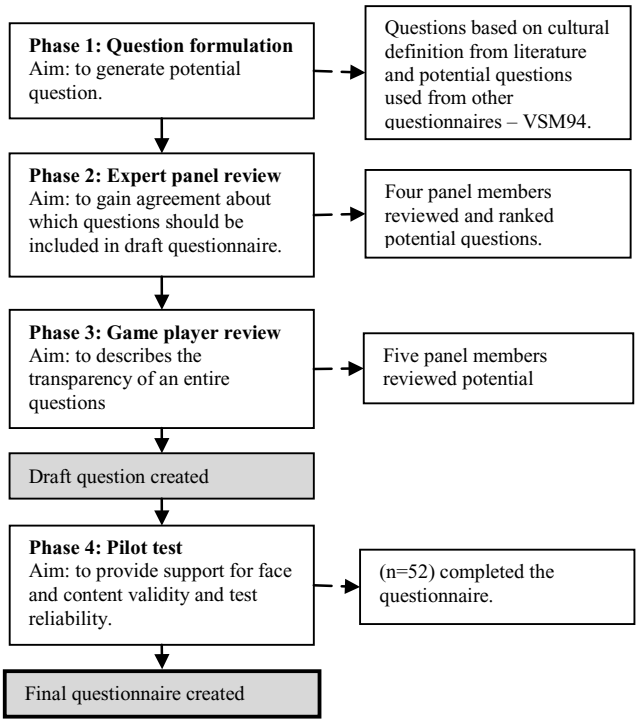

Fig 2 Process of questionnaire development and validation

2.2. Quantitative Method

The quantitative method is employed in the pilot study, by distributing the questionnaire that has been validated using qualitative methods [13]. The purpose of conducting a pilot study is to evaluate the suitability of an approach to be used in large-scale studies. It is not a hypothesis testing study. Results of a pilot study can identify if modifications are required in the design of larger scale. The respondents were asked to rate the items in the questionnaire using a 10-point Likert scale, 1- for strongly disagree and 10- for strongly agree. By using online questionnaire, 62 volunteer respondents, who play games were selected. However, only 52 feedbacks are used, which are from respondents who play computer games seven or more times a week.

3. Result and Discussion

Overall it takes 23 weeks to complete four phases of development and validation of questionnaire. The questionnaire contains 30 questions in total and 11 of it are demographic questions. In second phase of development and validation process that shows in Fig 2, which is expert panel review, four selected experts gave their comments. First Interview session start with expert-1 and it took around 60 minutes. 2 questions (10.5%) have been ranked at 5 points and 1 question (5.3%) has been ranked at 6 points. The rest of the questions were ranked at 7, 8 and 9 points (84.2%) with no further comment. The comments for two questions that the expert ranked as 5 are “question does not really capture the dimension accurately” and “does not accurately reflect the meaning of IDV”. Question that the expert 1 ranked as 6 is related to MAS. The expert asked to rephrase the question by adding the phrase “failure of gaming”. Therefore, those questions were redefined and modified.

Interview session for expert-2 took place after the questionnaire has been redefined. Thus, expert-2 was given two sets of questionnaires; the original and the modified version. Nevertheless, expert-2 was given the freedom to choose which set of questionnaire to review. Expert-2 chose to review the new version but for some questions, she still referred to the original draft questionnaire. Few modifications were made together with the experts. Expert-2

recommended beginning each question with the phrase "I like or I prefer" rather than using phrase "Player prefers or player likes". Both expert-1 and 2 are from culture background. The modified version of draft questionnaire then was evaluated by expert-3 and expert-4 who are HCI experts. They need to give comments from HCI point of view. Both experts were interviewed on consecutive dates. With minor modifications, the questionnaire was changed and a second round of interviews with experts 1, 2, 3 and 4 are made. Only two experts are available to be interviewed for the second round and the others prefer to give respond via email. Expert-3 suggested modifying only one question but expert-1, 2 and 4 are satisfied with the questionnaire. Table 1 shows some of the adapted questions that have been ranked with low marks and the modified questions based on the comments.

Table 1 Original, adapted and modified questions based on expert 1

Original Question (VSM 96)	Adapted Question	Modified Question (based on expert's comment)
Subordinates afraid to express disagreement with superiors.	Refused to express disagreement and continue playing even I am distracted.	I continue playing even though I am distracted by the graphic on the computer game interface.
When people fail in life, it is their own fault	The game is fail to be enjoyed is not due to the graphic design.	The failure of a computer game is not due to the graphic design on the computer game interface.
When people fail in life, it is their own fault	The game is fail to be enjoyed is not due to the animation design.	The failure of a computer game is not due to the animation design on the computer game interface.

For phase three which is face validation process, all five game players give a very good feedback for all 30 closed ended questions. Phase four is a pilot study involving 62 respondents who have answered the online questionnaire. Their ages area round 18 - 30 years old. 52 respondents (84%) play computer games 7 times or more per week, 5 respondents (0.8%) play computer games 5 – 6 times per week and 24 respondents (0.8%) play computer games less than 4 times a week. Since the aim of this research is to observe the response of players who are considered 'real gamer', only responses from respondents who play computer games 7 times or more per week are used. Based on reliability test, the value of cronbach alpha for overall questions $\alpha = 0.955$. This illustrate that the reliability of questionnaire is very high.

4. Conclusion

This paper has discussed the development and validation of a questionnaire to validate game interface design model based on cultural values. The questionnaire focuses only on graphic and animation aspects. There are several phases conducted in order to gain a good questionnaire of game interface design with cultural values. Some changes have been made throughout the process. The validated questionnaire will be used to verify the culture based game interface design model that shown in Fig 1. The chosen method of development which has been detailed in this paper, gives a strong foundation for the validity and reliability of the questionnaire. Future study will explore the influence of culture on other elements of game interface.

Acknowledgements

This research is funded by Universiti Kebangsaan Malaysia under the research grant, UKM-GUP-2011-236.

References

[1] Hofstede, G., National Cultures in Four Dimensions: A Research-Based Theory of Cultural Differences among Nations. International Studies of Management & Organization, 1983. Vol. 13(No. 1/2): p. 46-74.
[2] Biljon, J. v., & Kotzé, P. (2008). Cultural factors in a mobile phone adoption and usage model. Journal of Universal Computer Science, 14(16), 2650-2679.
[3] Shneiderman, B., Designing for fun: how can we design user interfaces to be more fun?, in Interactions - Funology. 2004.
[4] Hall, E.T. and M.R. Hall, Understanding Cultural Differences. 1990: Intercultural Press. 196.
[5] Guo, Y., Savoy, A., Byrd, K., & Salvendy, G. (2009). Development and validation of an instrument to evaluate the content effectiveness of video games: A pilot study. Theoretical Issues in Ergonomics Science, 10(2), 107-133.
[6] CADLE, B., Are We There Yet? Graphic Design' S Next Destinations. 20/20 Design Vision, 2011: p. 37.
[7] Sánchez, J.L.G., et al., Playability: analysing user experience in video games. Behaviour & Information Technology, 2012. 31(10): p. 1033-1054.
[8] Ahmed, T., Mouratidis, H., & Preston, D. (2009). Website Design Guidelines: High Power Distance and High-Context Culture. International Journal of Cyber Society and Education, 2(1), 47-60.
[9] Noor, W. M. I. W. M., & Mehad, Ozok, A.,S. Zaphiris, P (2009). Cultural Prescription vs. User Perception of Information Architecture for Culture Centred Website: A Case Study on Muslim Online User. Online Communities and Social Computing, 535-544.
[10] Marcus, A., & Emilie West, G. (2000). Crosscurrents: cultural dimensions and global Web user-interface design. interactions, 7(4), 32-46.
[11] Kim, H., Coyle, J. R., & Gould, S. J. (2009). Collectivist and Individualist Influences on Website Design in South Korea and the US: A Cross Cultural Content Analysis. Journal of Computer Mediated Communication, 14(3), 581-601.
[12] Tashakkori, A. and C. Teddlie, Mixed Methodology: Combining Qualitative and Quantitative Approaches. 1998. p. 200.
[13] Sandelowski, M., Combining Qualitative and Quantitative Sampling, Data Collection, and Analysis Techniques in Mixed-Method Studies. Research in Nursing & Health, 2000. 23(3): p. 246–255.